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Original Research Article

Efficacy of Intrathecal Fentanyl for Prevention of PDPH in Cesarean Section

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Abstract:

Background and Aim: A side effect of spinal anaesthesia (SA) is postdural puncture headache (PDPH). The purpose of this study was to examine the effect of intrathecal fentanyl vs a control group in preventing PDPH in LSCS.

Methods and Materials: The current investigation was carried out at the Tertiary Care Institute of India's Department of Anesthesiology. A total of 200 ASA grade II patients aged 18 to 45 years who underwent elective or emergency caesarean section were chosen for the study and randomly assigned to one of two groups using a random number system. AF group: bupivacaine 2ml plus fentanyl 0.5ml (25 g) Group B was given 2mL of bupivacaine and 0.5mL of normal saline. A visual analogue scale (VAS) score was used to assess the severity of the headache. Adequate hydration, coffee, or 500 mg paracetamol were used to treat PDPH.

Results: The demographic profile in both groups was comparable. PDPH occurred in 1% of the fentanyl group and 5% of the control group. The PDPH in the fentanyl group was mild, while it was moderate in the control group. Backache, vertigo, nausea, and vomiting occurred at a rate of 1% in the fentanyl group, while they occurred at a rate of 3% in the control group. There was no mention of itchiness in any group.

Conclusion: Intrathecal fentanyl (25g) reduced the incidence and severity of post-dural puncture headache (PDPH) in caesarean delivery in a non-significant way. Though the severity increased in the control group, it was not statistically significant.

Keywords: Bupivacaine, Fentanyl, Postdural Puncture Headache, Visual Analogue Scale.

Introduction

Because of its advantages over epidural or general anaesthesia (GA), spinal anaesthesia (SA) is the recommended anaesthetic approach for Caeserean section (CS). It is simple to administer, inexpensive, and results in a rapid onset of anaesthesia and full muscular relaxation. However, it can lead to unintended consequences. Post-dural puncture headache (PDPH) is a typical complication in parturients after SA.[1] Although PDPH is not a life-threatening disorder, it can severely impair everyday activities. Furthermore, when severe, it can have disastrous consequences such as subdural haemorrhage and convulsions. Low CSF pressure can cause traction and rupture of subdural blood vessels, resulting in the formation of a subdural hematoma.[2]

Clinical studies have demonstrated that using smaller-gauge needles, particularly pencil-point needle tips, is associated with a decreased incidence of PDPH than using cutting-point needle tips.[3,4] However, the high cost and scarcity of pencil-point needles make them unsuitable for everyday use in parturients, particularly in low-income countries. Neuraxial narcotics were discovered to minimise the occurrence of PDPH following an accidental dural puncture (ADP) during epidural anaesthesia.[5-7] Martlew also did a 9-year prospective audit and discovered that spinal opioids may help prevent PDPH.[8]Intrathecal fentanyl was employed as an adjuvant to bupivacaine in SAB in our study. Smaller doses of fentanyl have a faster onset and a longer duration of action. Aside from being beneficial in systemic pain control, spinal opioids have been shown to minimise the incidence of PDPH in SAB and epidural anaesthesia.[9] The purpose of this study was to examine the effect of

intrathecal fentanyl vs a control group in preventing PDPH in LSCS.

Material and Methods

Following approval from the Institutional Scientific and Ethics Committee, the current study was carried out in the Department of Anesthesiology, Tertiary Care Institute of India. It was randomised double-blind interventional research.

A total of 200 ASA grade II patients aged 18 to 45 years who underwent elective or emergency caesarean section were chosen for the study and randomly assigned to one of two groups using a random number system.

AF group: bupivacaine 2ml plus fentanyl 0.5ml (25 g) Group B was given 2mL of bupivacaine and 0.5mL of normal saline.

Patients who had a history of migraine, persistent headache, psychiatric disease, neurological malfunction, or a problematic pregnancy were excluded from the trial. Parturients who required more than three lumbar puncture (LP) attempts were also eliminated.

Patients were sent to the operating room after a full pre-anesthesia check-up and written informed consent. Throughout the process, ECG, non-invasive blood pressure, heart rate, and SpO2 levels were monitored. An 18G cannula was used to establish an intravenous (IV) line, and all patients were hydrated with 10 ml/kg RL and premedicated with IV metoclopramide 10 mg. SAB was conducted in a sitting position at the L3-L4 interspace using a midline approach. After injecting the medication, the spinal needle was removed with the stylet in place using a 25-gauge Quincke spinal needle with the bevel in the lateral position.[10]All parturients were monitored postoperatively for headache and any other issues for the next three days in the ward and then telephonically after discharge until the 14th day. If a patient complained of a headache, the onset, features, duration, severity, aggravating and alleviating causes, and any other concomitant symptoms such as backache, vertigo, nausea, vomiting, or pruritis were all recorded. A visual analogue scale (VAS) score was used to assess the severity of the headache. Adequate hydration, coffee, or 500 mg paracetamol were used to treat PDPH.

Statistical investigation

The collected data was assembled and input into a spreadsheet programme (Microsoft Excel 2007) before being exported to the data editor page of SPSS version 15 (SPSS Inc., Chicago, Illinois, USA). The confidence level and level of significance for all tests were set at 95% and 5%, respectively.

Results

The demographic profile, which included mean age, weight, height, and BMI, was comparable in both groups. (Table 1) Various statistical approaches were used to analyse the results, including number, percentage, mean, standard deviation, Student's t-test, unpaired t-test, and chi-square test.

Table 1: Demographic profile

Variable	Group A (Mean ± SD)	Group B (Mean ± SD0
Age (yr)	25.50 ± 4.10	25.79±3.25
Weight (kg)	57.12 ± 7.32	57.82 ±5.19
Height (cm)	154.98 ± 19.87	155.47±4.65

Table 2: Post dural puncture headache

PDPH Characteristics	Group A No. of patients (%)	Group B No. of patients (%)	P value
Severity			
Mild (VAS≤3)	3 (3%)	1 (1%)	0.1
Moderate (VAS 4- 7)	2 (2%)	0	
Severe (VAS>7)	0	0	
Site			
Frontal	3 (3%)	1 (1%)	0.3
Generalized	2 (2%)	0	
Quality			
Dull aching	5 (5%)	1 (1%)	0.62
Throbbing	0	0	
Associated symptoms			
Backache	3 (3%)	1 (1%)	0.12
Vertigo	0	1 (1%)	
Nausea /vomiting	3 (3%)	1 (1%)	
Pruritus	0	0	

Statistically significance at p≤0.05

Discussion

One of the most painful consequences of neuraxial anaesthesia is PDPH. Due to the frequent use of neuraxial anaesthesia, parturients are at a higher risk of acquiring PDPH. Furthermore, female sex, youth, and pregnancy are all unmodifiable risk factors for post-spinal headache.[11,12] As a result, we focused our research on the obstetric population.PDPH develops as a result of an intentional dural puncture or ADP during neuraxial anaesthesia. Neuraxial narcotics were discovered to lower the incidence of PDPH following SA and in cases of ADP during epidural anaesthesia.[11,12]

The incidence of PDPH increases with needle gauge, while finer gauge spinal needles have a low incidence.[13] PDPH is estimated to affect nearly twice as many women as men.14 Patients with low BMI are more likely to have PDPH. Adequate hydration avoids PDPH, and the majority of patients react to mild analgesics such as paracetamol. Caffeine, sumatriptan, gabapentin, epidural blood patch, and acupuncture are some of the medications used to treat PDPH. The use of neuraxial opioids has been shown to minimise the occurrence of PDPH following SAB. The majority of trials have used intrathecal morphine to prevent PDPH during caesarean section.[15] In our investigation, the incidence of PDPH was lower in the fentanyl group than in the control group, which was statistically insignificant. Previously, it was observed that adding opioids to local anaesthetics reduced the intensity and duration of PDPH but did not diminish the incidence of PDPH [16.17] The mechanism is unknown, however systemic absorption of intrathecal morphine has been proposed as a possibility. However, this hypothesis is not difficult to establish because the modest dose and systemic absorption of morphine would not explain this. When employing varied amounts of spinal opioids, a lower incidence of PDPH has been recorded, as has a lower incidence of postoperative PDPH in the case of an inadvertent dural puncture following an attempt at epidural anaesthesia.[18,19]

The fentanyl group had a milder headache and a lower Visual Analogue Scale score for pain severity of PDPH than the control group (Table 2). The severity of PDPH differs considerably between the control and opioid groups, as demonstrated by a higher VAS score.[8,9] There was no statistically significant difference in the incidence of backache, nausea, vomiting, vertigo, or pruritis between the groups, and no other symptom was detected in either group. The combination of fentanyl and local anaesthesia eliminates visceral pain and avoids nausea and vomiting. When fentanyl is used instead of morphine, the incidence of nausea and vomiting is lower. Sultan et al20 examined the analgesic duration and side effects of morphine at various dosages in caesarean section cases in a meta-analysis. The high-dose morphine group required more analgesics at first.

The sample size of our study constituted a significant limitation. A larger sample size would have been more appropriate for reaching a statistically significant conclusion.

Conclusion

The incidence and intensity of post-dural puncture headache (PDPH) were reduced in a non-significant way with intrathecal fentanyl (25g) in caesarean section. Though the severity increased in the control group, it was not statistically significant. Although neuraxial fentanyl did not show an overall protective effect in this trial, its significance in preventing PDPH during caesarean section has to be studied. Future research on non-obstetric patients could validate our findings.

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